INDEX

Fishery Bulletin Vol. 76, No. 1-4

"Aggregation of the siphonophore *Nanomia cara* in the Gulf of Maine: observations from a submersible," by Carolyn A. Rogers, Douglas C. Biggs, and Richard A. Cooper 281

"Aging of Gulf menhaden, *Brevoortia patronus*," by William R. Nicholson and William E. Schaaf 315

AKIYAMA, GERALD S.—see MAY et al.

Alaska
  Kachemak Bay
    Lebbeus groenlandicus, description of larvae 457

Alaska, southeastern
  Sashin Creek
    salmon, pink 569

"Analysis of a simple model for estimating historical population sizes," by T. D. Smith and T. Polacheck ... 771

"Analysis of chlorinated hydrocarbon pollutants: a simplified extraction and cleanup procedure for fishery products," by Virginia F. Stout and F. Lee Beezhold .. 880

Anchoa mitchilli—see Anchovy, bay

Anchovy, bay
  larval
    simulated food patches and survival of 485
  small preserved
    number and length frequency, subsampler for estimating 490

Anchovy, northern
  precision of simulated transect surveys of school groups 679
  school shapes as related to problems in school size estimation 443

ANDERSON, SHANE—see WELLINGTON and ANDERSON

Annelids, polychaetous
  Delaware Bay region 209

Archosargus rhomboidalis—see Bream, sea

ARNOLD, C. R.—see FABLE et al.

"Aspects of brown shrimp, *Penaeus aztecus*, growth in the northern Gulf of Mexico," by Michael L. Parrack 827

"Aspects of estuarine intertidal ecology of juvenile striped mullet, *Mugil cephalus*, in Hawaii," by Peter F. Major 299

Atlantic Ocean, northwest
  fishes, laboratory reared larvae
    length-weight relations 890

Atlantic Ocean, western north
  marlin, white
    sex composition, length-weight relationship, and reproduction 919

AUSTIN, HERBERT M., and CLARENCE R. HICKEY, JR., "Predicting abundance of striped bass, *Morone saxatilis*, in New York waters from modal lengths" ... 467

BAGLIN, RAYMOND, JR., "Sex composition, length-weight relationship, and reproduction of the white marlin, *Tetrapturus albidus*, in the western north Atlantic Ocean" 919

Balenoptera musculus—see Whale, blue

BARKLEY, RICHARD A., WILLIAM H. NEILL, and REGINALD M. GOODING, "Skipjack tuna, *Katsuwonus pelamis*, habitat based on temperature and oxygen requirements" 653

BARR, BRADLEY—see KATONA et al.

Bass, kelp
  kelp forests off Santa Barbara, California
    diet and habitat distribution 257

Bass, striped
  New York waters
    abundance, prediction from modal lengths 467
  relative contribution of Hudson, Chesapeake, and Roanoke stocks to Atlantic coast fishery
    best estimator of relative contribution 341
    discriminant functions, establishing 340
    estimating stock contribution for oceanic and overwintering collections 342
    spawning-stock specimens, analysis 337
    spawning-stock specimens, collection 336
    spawning-stock specimens, processing 336
    stock percentages, adjusting estimates 337

BECKER, DALE, and DENNIS D. DAUBLE, "Records of piscivorus leeches (Hirudinea) from the central Columbia River, Washington State" 926

BEEZHOLD, F. LEE—see STOUT and BEEZHOLD

BEN-TUVIA, ADAM, "Immigration of fishes through the Suez Canal" 249

BERGGREN, THOMAS, and JOEL T. LIEBERMAN,

"Relative contribution of Hudson, Chesapeake, and Roanoke striped bass, *Morone saxatilis*, stocks to the Atlantic coast fishery" 335

BERRIEN, PETER L., "Eggs and larvae of *Scomber scombrus* and *Scomber japonicus* in continental shelf waters between Massachusetts and Florida" 95

BERRIEN, PETER L.—see COLTON et al.

BERRY, FREDERICK H.—see ELDRIDGE et al.

BIGFORD, THOMAS E., "Effect of several diets on survival, development time, and growth of laboratory-reared spider crab, *Libinia emarginata*, larvae" 59

BIGGS, DOUGLAS C.—see ROGERS et al.

"Bioeconomic contribution of Columbia River hatchery fall chinook salmon, 1961 through 1964 broods, to the Pacific salmon fisheries," by Roy J. Wahle and Robert R. Vreeland 179

BLEDSOE, L. J.—see RIVARD and BLEDSOE

Bloodworm, tychoplanktonic
  Sullivan Harbor, Maine 480

BONE, QUENTIN, JOE KICENIUK, and DAVID R. JONES, "On the role of the different fibre types in fish myotomes at intermediate swimming speeds" 691

BOYD, STEVEN—see ORTNER et al.

Brazil
  São Paulo
    Euterpina acutifrons, synergistic effects on metabolism 449

Bream, sea
  larval, simulated food patches and survival of 483

BRENNAN, J. A.—see BROWN et al.

Brevoortia patronus—see Menhaden, Gulf

Bristol Bay
  salmon, sockeye
    identifying stocks by evaluating scale patterns with a polynomial discriminant method 415

BROUSSEAU, DIANE J., "Spawning cycle, fecundity, and recruitment in a population of soft-shell clam, *Mya arenaria*, from Cape Ann, Massachusetts" 155

BROWN, B. E., J. A. BRENNAN, and J. E. PALMER, "Linear programming simulations of the effects of bycatch on the management of mixed species fisheries off the northeastern coast of the United States" 851

BULLARD, FERN A., and JEFF COLLINS, "Physical and chemical changes of pink shrimp, *Pandalus borealis*, held in carbon dioxide modified refrigerated seawater compared with pink shrimp held in ice" 73

California
  California and Gulf of California grunions
    hybridization, reciprocal 476
  fishes, littoral
    thermal behavioral responses of selected 837
  Santa Barbara, kelp forests off
    food and habitat of three switch-feeding fishes ... 257

California, southern
  scallop, rock
    trace metal contamination 936

CALKINS, DONALD G., "Feeding behavior and major prey species of the sea otter, *Enhydra lutris*, in Montague Strait, Prince William Sound, Alaska" 125

Callinectes danae
  recent records from North Carolina 879

Callinectes marginatus
  recent records from North Carolina 879

Cancer borealis—see Crab, rock

Cancer irroratus—see Crab, Jonah

Cape Ann, Massachusetts
  clam, soft shell
    spawning cycle, fecundity, and recruitment 155

Cephalolobus penaeus
  parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 12

Cephalopods
  Hawaiian
    vertical distribution and photosensitive vesicles .. 583

Charleston, South Carolina
  ichthyoneuston, catches
    Boothbay neuston net 295

CHESS, JAMES R.—see HOBSON and CHESS

Chlorinated hydrocarbon pollutants
  analysis of 880

CHRISTENSEN, M. S., "Trophic relationships in juveniles of three species of sparid fishes in the South African marine littoral" 389

Citharichthys sordidus—see Sanddab, Pacific

Citharichthys stigmaeus—see Sanddab, speckled

Clam, soft-shell
  spawning cycle, fecundity, and recruitment from Cape Ann, Massachusetts
    recruitment 162
    reproductive cycle 158
    sex ratios and fecundity 159

CLARKE, THOMAS A., "Diel feeding patterns of 16 species of mesopelagic fishes from Hawaiian waters" . 495

Clupea harengus pallasi—see Herring, Pacific

Cod, Pacific
summer food near Kodiak Island, Alaska 700

COLIN, PATRICK L., "Daily and summer-winter variation in mass spawning of the striped parrotfish, *Scarus croicensis*" 117

COLLETTE, BRUCE B., JOSEPH L. RUSSO, and LUIS ALBERTO ZAVALA-CAMIN, "*Scomberomorus brasiliensis*, a new species of Spanish mackerel from the western Atlantic" 273

COLLINS, JEFF—see BULLARD and COLLINS

COLTON, JOHN B., JR., WALLACE G. SMITH, ARTHUR W. KENDALL, JR., PETER L. BERRIEN, and MICHAEL P. FAHAY, "Principal spawning areas and times of marine fishes, Cape Sable to Cape Hatteras" 911

Columbia River, Washington State
leeches, piscivorus
records of 926

Columbia River hatchery
fall chinook salmon
bioeconomic contribution to Pacific salmon fisheries 179

"Computer program for analysis of the homogeneity and goodness of fit of frequency distributions, FORTRAN IV," by Michael L. Dahlberg 285

"(A) computer software system for optimizing survey cruise tracks," by Thomas D. Leming and Hillman J. Holley 706

COOK, RODNEY C., and GARY E. LORD, "Identification of stocks of Bristol Bay sockeye salmon, *Oncorhynchus nerka*, by evaluating scale patterns with a polynomial discriminant method" 415

COOPER, JOHN C.—see SCHOLZ et al.

COOPER, RICAHRD A.—see ROGERS et al.

Copepod
Euterpina acutifrons
synergistic effects on metabolism 449

"Copper sensitivity of Pacific herring, *Clupea harengus pallasi*, during its early life history," by D. W. Rice, Jr. and F. L. Harrison 347

COUCH, JOHN A., "Diseases, parasites, and toxic responses of commercial penaeid shrimps of the Gulf of Mexico and South Atlantic coasts of North America" 1

Crab, Jonah
traps, escape vent shape 425

Crab, rock
traps, escape vent shape 425

Crab, sand
growth rate in two different environments
environmental differences 371
instantaneous growth rate rationale 370
localities 370
measuring growth 373
sampling 370

Crab, spider
diets, several
effect on survival, development time, and growth of larvae 59

Crabs, harvestable-sized
traps, escape vent shape 425

CRADDOCK, DONOVAN R., "Effect of thermal increases of short duration on survival of *Euphausia pacifica*" 895

CREASER, EDWIN P., JR.—see GRAHAM and CREASER

Croaker, Atlantic
small preserved
number and length frequency, subsampler for estimating 490

Cruise tracks
computer software system for optimizing survey ... 706

Cynoscion nebulosus—see Seatrout, spotted

DAHLBERG, MICHAEL L., "Computer program for analysis of the homogeneity and goodness of fit of frequency distributions, FORTRAN IV" 285

"Daily and summer-winter variation in mass spawning of the striped parrotfish, *Scarus croicensis*," by Patrick L. Colin 117

DAUBLE, DENNIS D.—see BECKER and DAUBLE

Delaware Bay
polychaetous annelids 209

"Description of larvae of hippolytid shrimp, *Lebbeus groenlandicus*, reared in situ in Kachemak Bay, Alaska," by Evan Haynes 457

"Description of larvae of the humpy shrimp, *Pandalus goniurus*, reared in situ in Kachemak Bay, Alaska," by Evan Haynes 235

"Description of reared eggs and young larvae of the spotted seatrout, *Cynoscion nebulosus*," by William A. Fable, Jr., Theodore D. Williams, and C. R. Arnold 65

"Diel feeding patterns of 16 species of mesopelagic fishes from Hawaiian waters," by Thomas A. Clarke 495

"Diel movements of larval yellowtail flounder, *Limanda*

ferruginea, determined from discrete depth sampling," by W. G. Smith, J. D. Sibunka, and A. Wells 167

Diodon—see Porcupinefishes

Diplodus cervinus
trophic relationships in South African marine littoral
dentition and gut morphology 398
dietary composition 396
recruitment and growth 393

Diplodus sargus
trophic relationships in South African marine littoral
dentition and gut morphology 398
dietary composition 394
recruitment and growth 392

"Discovery of juvenile Pacific salmon (coho) in a small coastal stream of New Brunswick," by Philip E. K. Symons and James D. Martin 487

"Diseases, parasites, and toxic responses of commercial penaeid shrimps of the Gulf of Mexico and South Atlantic coasts of North America," by John A. Couch 1

"Distribution and abundance of small flatfishes and other demersal fishes in a region of diverse sediments and bathymetry off Oregon," by William G. Pearcy ... 629

"Diurnal variations in catches of selected species of ichthyoneuston by the Boothbay neuston net off Charleston, South Carolina," by Peter J. Eldridge, Frederick H. Berry, and M. Clinton Miller, III 295

Dolphin, white-sided
Gulf of Maine
probably killed in gill nets 475

Drop net, portable tripod
estuarine fish studies 285

EBELING, ALFRED W.—see LOVE and EBELING

"Effect of several diets on survival, development time, and growth of laboratory-reared spider crab, *Libinia emarginata*, larvae," by Thomas E. Bigford 59

"Effect of starvation on the histological and morphological characteristics of jack mackerel, *Trachurus symmetricus*, larvae," by Gail H. Theilacker 403

"Effect of thermal increases of short duration on survival of *Euphausia pacifica*," by Donovan R. Craddock 895

"Effectiveness of escape vent shape in traps for catching legal-sized lobster, *Homarus americanus*, and harvestable-sized crabs, *Cancer borealis* and *Cancer irroratus*," by Jay S. Krouse 425

"Effects of swimming speed on the excess temperatures and activities of heart and red and white muscles in the mackerel, Scomber *japonicus*," by John L. Roberts and Jeffrey B. Graham 861

Eggs, fish—see Fish eggs

"Eggs and larvae of *Scomber scombrus* and *Scomber japonicus* in continental shelf waters between Massachusetts and Florida," by Peter L. Berrien 95

EHRLICH, KARL F., J. MYRON HOOD, GERALD MUSZYNSKI, and GERALD E. McGOWEN, "Thermal behavioral responses of selected California littoral fishes" 837

EHRLICH, KARL F., JOHN S. STEPHENS, GERALD MUSZYNSKI, and J. MYRON HOOD, "Thermal behavioral responses of the speckled sanddab, *Citharichthys stigmaeus*: Laboratory and field investigations" 867

El Niño
historical trends and statistics 663

ELDRIDGE, PETER J., FREDERICK H. BERRY, and M. CLINTON MILLER, III, "Diurnal variations in catches of selected species of ichthyoneuston by Boothbay neuston net off Charleston, South Carolina" 295

Emerita analoga—see Crab, sand

Enewetak Atoll
Marshall Islands
trophic relationships among fishes and plankton . 133

Engraulis mordax—see Anchovy, northern

Enhydra lutris—see Otter, sea

Ephelota sp.
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 21

Eschrichtius robustus—see Whale, grey

"Estimated zooplankton production and their ammonia excretion in the Kuroshio and adjacent seas," by Tsutomu Ikeda and Sigeru Motoda 357

"Estimating natural and fishing mortalities of chinook salmon, *Oncorhynchus tshawytscha*, in the ocean, based on recoveries of marked fish," by Kenneth A. Henry .. 45

Euphausia pacifica
thermal increases of short duration, effect on survival 895

Euterpina acutifrons
coast of São Paulo
environmental variables on the metabolism, synergistic effects of 449

FABLE, WILLIAM A., J., THEODORE D. WILLIAMS, and C. R. ARNOLD, "Description of reared eggs and young larvae of the spotted seatrout, *Cynoscion nebulosus*" 65

FAHAY, MICHAEL P.—see COLTON et al.

"Feeding behavior and major prey species of the sea otter, *Enhydra lutris*, in Montague Strait, Prince William Sound, Alaska," by Donald G. Calkins 125

"Feeding habits of Dover sole, *Microstomus pacificus*; rex sole, *Glyptocephalus zachirus*; slender sole, *Lyopsetta exilis*; and Pacific sanddab, *Citharichthys sordidus*, in a region of diverse sediments and bathymetry off Oregon," by William G. Pearcy and Danil Hancock 641

FIEDLER, PAUL C., "The precision of simulated transect surveys of northern anchovy, *Engraulis mordax*, school groups" 679

Fish
pollution-associated diseases and abnormalities
experimentally induced lesions 736
fin rot 719
genetic abnormalities 734
lymphocystis 725
neoplasms 728
pollutant-parasite interactions 740
skeletal anomalies 732
stress-provoked latent infections 727
ulcers 722

Fish eggs
porcupinefishes
development, comments on 535

Fish larvae
Anchoa mitchilli, larval bay
simulated food patches and survival of 483
flounder, yellowtail
diel movements determined from discrete depth sampling 167
larval rearing 931
mackerel, Atlantic
continental shelf waters between Massachusetts and Florida 95
mackerel, chub
continental shelf waters between Massachusetts and Florida 95
northwest Atlantic fishes, laboratory reared
length-weight relations 890
porcupinefishes
development, comments on 535
sea bream
simulated food patches and survival of 485
seatrout, spotted 65
shrimp, humpy
description 235

Fisheries, mixed species
United States, northeastern coast
linear programming simulations of effects of by-catch on management 851

Fishery products
chlorinated hydrocarbon pollutants in
simplified extraction and cleanup procedure for .. 880

Fishes
thermal behavioral responses of selected California littoral
behavioral criteria 845
data analyses 841
experimental criteria 837
gradient design 839
relationship of temperatures selected and thermal history 843
temperature gradient shifting and reversal 841
trophic relationships among, and plankton at Enewetak Atoll
currents, strong 140
currents, weak 137
diurnal relationships 145
fish collection 136
mysids as prey during day 151
nocturnal increase in fish eggs 150
nocturnal relationships 148
planktivore morphology and distance from reef .. 151
plankton collection 135
water depth and size influence 150

Fishes, marine
spawning
principal areas and times of 911

Fishes, mesopelagic
Hawaiian
diel feeding patterns of 16 species 495
vertical distribution, vertical migrations, and abundance in eastern Pacific Ocean
abundance and standing stock estimation 762
abundance variability in replicated samples 762
micronekton associated with sound-scattering layers 764
sample analysis 755
sampling gear 752
sampling program 753
study area 752
vertical distribution of crustaceans 763
vertical distribution of fish 755

Flatfishes
Oregon
distribution and abundance 629

FLETCHER, R. IAN, "On the restructuring of the Pella-Tomlinson system" 515

FLETCHER, R. IAN, "Time-dependent solutions and efficient parameters for stock-production models" 377

Flounder, yellowtail
diel movements determined from discrete depth sampling 167
induced spawning and larval rearing 931

"Food and feeding habits of juvenile Atlantic tomcod, *Microgadus tomcod*, from Haverstraw Bay, Hudson River," by Stephen A. Grabe 89

"Food and habitat of three switch-feeding fishes in the kelp forests off Santa Barbara, California," by Milton S. Love and Alfred W. Ebeling 257

FORTRAN IV
frequency distribution 285

FROST, BRUCE W., and LAWRENCE E. McCRONE, "Vertical distribution, diel vertical migration, and abundance of some mesopelagic fishes in the eastern subarctic Pacific Ocean in summer" 751

FUSARO, CRAIG, "Growth rate of the sand crab, *Emerita analoga*, (Hippidae) in two different environments" 369

Gadus macrocephalus—see Cod, Pacific

Galathea rostrata
larval development under laboratory conditions
ecdysial and sequential variation 783
fifth zoea 797
first zoea 788
fourth zoea (advanced) 796
fourth zoea (regular) 794
megalopa 799
second zoea 790
synopses of galatheid larvae 803
third zoea 792

GILMORE, R. GRANT, JOHN K. HOLT, ROBERT S. JONES, GEORGE R. KULCZYCKI, LOUIS G. MacDOWELL III, and WAYNE C. MAGLEY, "Portable tripod drop net for estuarine fish studies" 285

Glycera dibranchiata—see Bloodworm, tychoplanktonic

Glyptocephalus zachirus—see Sole, rex

GOODING, REGINALD M.—see BARKLEY et al.

GORE, ROBERT H., "Larval development of *Galathea rostrata* under laboratory conditions, with a discussion of larval development in the Galatheidae (Crustacea Anomura)" 781

GRABE, STEVEN A., "Food and feeding habits of juvenile Atlantic tomcod, *Microgadus tomcod*, from Haverstraw Bay, Hudson River" 89

GRAHAM, JEFFREY B.—see ROBERTS and GRAHAM

GRAHAM, JOSEPH J., and EDWIN P. CREASER, JR., "Tychoplanktonic bloodworm, *Glycera dibranchiata*, in Sullivan Harbor, Maine" 480

"Growth of juvenile spot prawn, *Pandalus platyceros*, in the laboratory and in net pens using different diets," by John E. Rensel and Earl F. Prentice 886

"Growth rate of the sand crab, *Emerita analoga*, (Hippidae) in two different environments," by Craig Fusaro 369

Grunion, California
hybridization, reciprocal 476

Grunion, Gulf of California
hybridization, reciprocal 476

Gulf of Maine
Nanomia cara
aggregation 281

Gulf of Mexico
shrimp, penaeid
diseases, parasites, and toxic responses 1

Gulf of Mexico, northern
shrimp, brown
aspects of growth 827

Gulf stream
cold core rings
contribution to zooplankton biomass distribution variability in Sargasso Sea 323

Halibut, Pacific
catch-effort data, analysis of 523

HANCOCK, DANIL—see PEARCY and HANCOCK

HARRISON, F. L.—see RICE and HARRISON

HASLER, ARTHUR D.—see SCHOLZ et al.

HAURY, LOREN—see ORTNER et al.

Haverstraw Bay
Hudson River, New York
tomcod, Atlantic, food and feeding habits 89

Hawaii
cephalopods
vertical distribution and photosensitive vesicles .. 583
mesopelagic fishes
diel feeding patterns 495

Hawaiian Islands
marlin, blue
mercury and selenium content 872

HAYNES, EVAN, "Description of larvae of hippolytid shrimp, *Lebbeus groenlandicus*, reared in situ in Kachemak Bay, Alaska" 457

HAYNES, EVAN, "Description of larvae of the humpy shrimp, *Pandalus goniurus*, reared in situ in Kachemak Bay, Alaska" 235

HEARD, WILLIAM R., "Probable case of streambed overseeding—1967 pink salmon, *Oncorhynchus gorbuscha*, spawners and survival of their progeny in Sashin Creek, southeastern Alaska" 569

Heceta Bank, Oregon
demersal fishes
distribution and abundance 629

HENRY, KENNETH A., "Estimating natural and fish-

ing mortalities of chinook salmon, Oncorhynchus tshawytscha, in the ocean, based on recoveries of marked fish" 45

HERKE, WILLIAM H., "Subsampler for estimating the number and length frequency of small preserved nektonic organisms" 490

Herring, Pacific
copper sensitivity during early life history
bioassay system 348
collection and handling 348
continuous exposures 351
statistical analysis 350
thirty-six hour pulsed exposures 353

HICKEY, CLARENCE R., JR.—see AUSTIN and HICKEY

Hirudina—see Leeches

"Historical trends and statistics of the Southern Oscillation, El Niño, and Indonesian droughts," by William H. Quinn, David O. Zopf, Kent S. Short, and Richard T. W. Kuo Yang 663

HOBSON, EDMUND S., and JAMES R. CHESS, "Trophic relationships among fishes and plankton in the lagoon at Enewetak Atoll, Marshall Islands" 133

HOLLEY, HILLMAN J.—see LEMING and HOLLEY

HOLT, JOHN K.—see GILMORE et al.

Homarus americanus—see Lobster, legal-sized

"Homing of morpholine-imprinted brown trout, *Salmo trutta*," by Allan T. Scholz, Jon C. Cooper, Ross M. Horrall, and Arthur D. Hasler 293

HOOD, J. MYRON—see EHRLICH et al.

HORRALL, ROSS M.—see SCHOLZ et al.

HOUDE, EDWARD D., and RICHARD C. SCHEKTER, "Simulated food patches and survival of larval bay anchovy, *Anchoa mitchilli*, and sea bream, *Archosargus rhombiodalis*" 483

HURLEY, ANN C., "School structure of the squid *Loligo opalescens*" 433

"Identification of stocks of Bristol Bay sockeye salmon, *Oncorhynchus nerka*, by evaluating scale patterns with a polynomial discriminant method," by Rodney C. Cook and Gary E. Lord 415

IKEDA, TSUTOMU, and SIGERU MOTODA, "Estimated zooplankton production and their ammonia excretion in the Kuroshiro and adjacent seas" 357

"Immigration of fishes through the Suez Canal," by Adam Ben-Tuvia 249

Indonesian droughts
historical trends and statistics 663

"Induced spawning and larval rearing of the yellowtail flounder, *Limanda ferruginea*," by Alphonse S. Smigielski 931

"*Intersex anomalies in shrimp of the genus Penaeopsis* (Crustacea: Penaeidae)," by Isabel Pérez Farfante 687

ITO, BERNARD M.—see SHULTZ and ITO

JAN, TSU-KAI—see YOUNG and JAN

JEWETT, STEPHEN C., "Summer food of the Pacific cod, *Gadus macrocephalus*, near Kodiak Island, Alaska" .. 700

JONES, DAVID R.—see BONE et al.

JONES, ROBERT S.—see GILMORE et al.

Kachemak Bay, Alaska
Lebbeus groenlandicus, description of larvae 457

KATONA, STEVEN K., SALVATORE A. TESTAVERDE, and BRADLEY BARR, "Observation on a white-sided dolphin, *Lagenorhynchus acutus*, probably killed in gill nets in the Gulf of Maine" 475

Katsuwonus pelamis—see Tuna, skipjack

KENDALL, ARTHUR W., JR.—see COLTON et al.

KICENIUK, JOE—see BONE et al.

KINNER, PETER, and DON MAURER, "Polychaetous annelids of the Delaware Bay region" 209

Kodiak Island
Pacific cod
summer food near 700

KROUSE, JAY S., "Effectiveness of escape vent shape in traps for catching legal-sized lobster, *Homarus americanus*, and harvestable-sized crabs, *Cancer borealis* and *Cancer irroratus*" 425

KULCZYCKI, GEORGE R.—see GILMORE et al.

Kuroshio
zooplankton production and ammonia excretion 357

Lagenorhynchus acutus—see Dolphin, white-sided

Lagenophrys lunatus
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 17

Larvae
reared in situ in Kachemak Bay, Alaska
Lebbeus groenlandicus, description of 457

Larvae, fish—see Fish larvae

Larval development of *Galathea rostrata* under laboratory conditions, with a discussion of larval development in the Galatheidae (Crustacea Anomura)," by Robert H. Gore 781

"Larval length-weight relations for seven species of northwest Atlantic fishes reared in the laboratory," by Geoffrey C. Laurence 890

LAURENCE, GEOFFREY C., "Larval length-weight relations for seven species of northwest Atlantic fishes reared in the laboratory" 890

Lebbeus groenlandicus
reared in situ in Kachemak Bay, Alaska
larvae, description of 457

Leeches, piscivorus
central Columbia River, Washington State
records of 926

LEIS, JEFFREY M., "Systematic and zoogeography of the porcupinefishes (*Diodon*, Diodontidae, Tetraodontiformes), with comments on egg and larval development" 535

LEMING, THOMAS D., and HILLMAN J. HOLLEY, "A computer software system for optimizing survey cruise tracks" 706

LENARZ, WILLIAM H., and JAMES R. ZEWIFEL, "A theoretical examination of some aspects of the interaction between longline and surface fisheries for yellowfin tuna, *Thunnus albacares*" 807

Leptomonas sp.
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 21

Leuresthes sardina—see Grunion, Gulf of California

Leuresthes tenuis—see Grunion, California

Levenberg-Marquardt algorithm
derivative-free version
Pella-Tomlinson model parameters, estimation of 523

Libinia emarginata—see Crab, spider

LIEBERMAN, JOEL T.—see BERGGREN and LIEBERMAN

Limanda ferruginea—see Flounder, yellowtail

"Linear programming simulations of the effects of bycatch on the management of mixed species fisheries off the northeastern coast of the United States," by B. E. Brown, J. A. Brennan, and J. E. Palmer 851

Lobster, legal-sized
traps, escape vent shape 425

Loligo opalescens
school structure 433

LORD, GARY E.—see COOK and LORD

LOVE, MILTON S., and ALFRED W. EBELING, "Food and habitat of three switch-feeding fishes in the kelp forests off Santa Barbara, California" 257

Lunar spawning—see Spawning, lunar

"Lunar spawning of the threadfin, *Polydactylus sexfilis*, in Hawaii," by Robert C. May, Gerald S. Akiyama, and Michael T. Santerre 900

Lyopsetta exilis—see Sole, slender

McCRONE, LAWRENCE E.—see FROST and McCRONE

MacDOWELL, LOUIS, III—see GILMORE et al.

McGOWEN, GERALD E.—see EHRLICH et al.

Mackerel, Atlantic
eggs and larvae between Massachusetts and Florida
body proportions 99
contrasting changes 104
distribution of eggs and larvae 104
identification 96
meristic characters 98
pigmentation 101
sampling 95
treatment of specimens and data 97

Mackerel, club
effect of swimming speed on excess temperatures and activities of muscles
body temperatures 864
calibration procedures 862
muscle activity at different swimming speeds 865
surgical procedures and swimming experiments 861
eggs and larvae between Massachusetts and Florida
body proportions 99
contrasting characters 104
distributions of eggs and larvae 108
identification 96
meristic characters 98
pigmentation 101
sampling 95
treatment of specimens and data 97

Mackerel, jack
effect of starvation on histological and morphological characteristics
brain 405
comparison of histological and morphological techniques 410
data analysis 405
digestive tract 405
histological grading system 404, 408
liver 405
musculature 408
pancreas 405

Mackerel, Spanish
Scomberomorus brasiliensis 273

Macrobrachium rosenbergii—see Prawn, Malaysian

MAGLEY, WAYNE C.—see GILMORE et al.

Maine
Sullivan Harbor
bloodworm, tychoplanktonic 480

MAJOR, PETER F., "Aspects of estuarine intertidal ecology of juvenile striped mullet, *Mugil cephalus*, in Hawaii" 299

Makaira nigricans—see Marlin, blue

MARKLE, DOUGLAS F., "Taxonomy and distribution of *Rouleina attrita* and *Rouleina maderensis* (Pisces: Alepocephalidae)" 79

Marlin, blue
mercury and selenium in
from Hawaiian Islands 872

Marlin, white
Atlantic, western north
sex composition, length-weight relationship, and reproduction 919

MARTIN, JAMES D.—see SYMONS and MARTIN

MAURER, DON—see KINNER and MAURER

MAY, ROBERT C., GERALD S. AKIYAMA, and MICHAEL T. SANTERRE, "Lunar spawning of the threadfin, *Polydactylus sexfilis*, in Hawaii" 900

Mediterranean Sea
Red Sea, fishes found in 249

Menhaden, Gulf
aging
juvenile tagging 318
length-frequency distributions 317
rings, incidence and spacing 318
rings, validity as year marks 316
small preserved
number and length frequency, subsampler for estimating 490

Menidia beryllina—see Silverside, tidewater

Mercury
marlin, blue, from Hawaiian Islands 872

"Mercury and selenium in blue marlin, *Makaira nigricans*, from the Hawaiian Islands," by Cynthia D. Shultz and Bernard M. Ito 872

Mesopelagic fishes—see Fishes, mesopelagic

Metal contamination
scallop, rock
near large municipal outfall 936

Microgadus tomcod—see Tomcod, Atlantic

Microphallus sp.
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 24

Micropogon undulatus—see Croaker, Atlantic

Microstomus pacificus—see Sole, Dover

MILLER, M. CLINTON, III—see ELDRIDGE et al.

MOFFATT, NANCY M., and DONALD A. THOMSON, "Reciprocal hybridization between the California and the Gulf of California grunions, *Leuresthes tenuis* and *Leuresthes sardina* (Atherinidae)" 476

Montague Strait
Prince William Sound, Alaska
otter, sea, feeding behavior and major prey species 125

MOREIRA, G. SOARES, and W. B. VERNBERG, "Synergistic effects of environmental variables on the metabolism of the copepod *Euterpina acutifrons* from two different areas off the coast of the State of São Paulo, Brazil" 449

Morone saxatilis—see Bass, striped

MOTODA, SIGERU—see IKEDA and MOTODA

Mugil cephalus—see Mullet, striped

Mullet, striped
ecology, aspects of estuarine intertidal
distribution 305
field sites and capture of fish 299
predators 307

Muscles
mackerel, chub
effect of swimming speed on excess temperatures and activities 861

MUSZYNSKI, GERALD—see EHRLICH et al.

Mya arenaria—see Clam, soft-shell

Nanomia cara
Gulf of Maine
aggregation 281

NEILL, WILLIAM H.—see BARKLEY et al.

Nekton
small preserved
number and length frequency, subsampler for estimating 490

Nematodes
parasitic on penaeid shrimp *Thynnascaris* sp. 26

Nematopsis brasiliensis
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 12

Nematopsis duorari
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 12

Nematopsis penaeus
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 12

Neuston net, Boothbay
ichythyoneuston catches
diurnal variations off Charleston, South Carolina 295

New Brunswick
Pacific salmon, juvenile
discovery in small coastal stream 487

New York
striped bass
abundance, prediction from modal lengths 467

NICHOLSON, WILLIAM R., and WILLIAM E. SCHAAF, "Aging of Gulf menhaden, *Brevoortia patronus*" 315

North Carolina
recent records of
Callinectes danae 879
Callinectes marginatus 879

"Northern anchovy school shapes as related to problems in school size estimation," by James L. Squire, Jr. ... 443

Nosema nelsoni
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 13

"Observations on a white-sided dolphin, *Lagenorhynchus acutus*, probably killed in gill nets in the Gulf of Maine," by Steven K. Katona, Salvatore A. Testaverde, and Bradley Barr 475

"On the restructuring of the Pella-Tomlinson system," by R. Ian Fletcher 515

"On the role of the different fibre types in fish myotomes at intermediate swimming speeds," by Quentin Bone, Joe Kiceniuk, and David R. Jones 691

Oncorhynchus gorbuscha—see Salmon, pink

Oncorhynchus kisutch—see Salmon, coho

Oncorhynchus nerka—see Salmon, sockeye

Oncorhynchus tshawytscha—see Salmon, chinook

Opecoeloides fimbriatus
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 24

Oregon
feeding habits off
sanddab, Pacific 641
sole, Dover 641
sole, Rex 641
sole, slender 641
small flatfishes and other demersal fishes
distribution and abundance 629

ORTNER, PETER B., PETER H. WIEBE, LOREN HAURY, and STEVEN BOYD, "Variability in zooplankton biomass distribution in the northern Sargasso Sea: the contribution of Gulf Stream cold core rings" 323

Oscillation, Southern
historical trends and statistics 663

Otter, sea
Montague Strait, Prince William Sound, Alaska
feeding behavior and major prey species 125

Pacific Ocean, eastern subarctic
fishes, vertical distribution, diel vertical migration, and abundance of some mesopelagic in summer 751

Pacific Ocean, eastern tropical
whale, blue
recent sightings 915

PALMER, J. E.—see BROWN et al.

Pandalus borealis—see Shrimp, pink

Pandalus goniurus—see Shrimp, humpy

Pandalus platyceros—see Prawn, spot

Parachristianella dimegancantha
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 24

Parachristianella heteronegacanthus
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 26

Parachristianella monomegacantha
parasitic on peaneid shrimp in Gulf of Mexico and South Atlantic 24

Paralabrax clathratus—see Bass, kelp

"Parameter estimation for the Pella-Tomlinson stock production model under nonequilibrium conditions," by D. Rivard and L. J. Bledsoe 523

Parauronema sp.
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 21

PARRACK, MICHAEL L., "Aspects of brown shrimp, *Penaeus aztecus*, growth in the northern Gulf of Mexico" 827

Parrotfish, striped

spawning, daily and summer-winter variation in mass
behavior, general 118
behavior, mass spawning 119
predation 122
spawning frequency 120

PEARCY, WILLIAM G., "Distribution and abundance of small flatfishes and other demersal fishes in a region of diverse sediments and bathymetry off Oregon" 629

PEARCY, WILLIAM G., and DANIL HANCOCK, "Feeding habits of Dover sole, *Microstomus pacificus*; rex sole, *Glyptocephalus zachirus*; slender sole, *Lyopsetta exilis*; and Pacific sanddab, *Citharichthys sordidus*, in a region of diverse sediments and bathymetry off Oregon" 641

PEEBLES, JOHN B., "The roles of prior residence and relative size in competition for shelter by the Malaysian prawn, *Macrobrachium rosenbergii*" 905

Pella-Tomlinson system
parameter estimation under nonequilibrium conditions 523
restructuring 515

Penaeopsis
intersex anomalies in shrimp of the genus 687

Penaeus aztecus—see Shrimp, brown

"(The) precision of simulated transect surveys of northern anchovy, *Engraulis mordax*, school groups," by Paul C. Fiedler 679

PEREZ FARFANTE, ISABEL, "Intersex anomalies in shrimp of the genus *Penaeopsis* (Crustacea: Penaeidae)" 687

PERSCHBACHER, PETER W., and FRANK J. SCHWARTZ, "Recent records of *Callinectes danae* and *Callinectes marginatus* (Decapoda: Portunidae) from North Carolina with environmental notes" 879

"Physical and chemical changes of pink shrimp, *Pandalus borealis*, held in carbon dioxide modified refrigerated seawater compared with pink shrimp held in ice," by Fern A. Bullard and Jeff Collins 73

Plankton
trophic relationships among fishes and, at Enewetak Atoll 133

Platyhelminthes
parasitic on penaeid shrimp
Microphallus sp. 24
Opecoeloides fimbriatus 24
Parachristianella dimegancantha 24
Parachristianella heteronegacanthus 26
Parachristianella monomegacantha 24
Prochristianella hispida 24
Renibulbus penaeus 26

Pleistophora (*Plistophora*) *penaei*
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 14

POLACHECK, T.—see SMITH and POLACHECK

Pollutants
chlorinated hydrocarbon, analysis of 880

Pollution
scallop, rock
trace metal contamination near municipal outfall 936

"Pollution-associated diseases and abnormalities of fish and shellfish: a review," by Carl J. Sindermann 717

Polychaetes
Delaware Bay region
polychaetous annelids 209

"Polychaetous annelids of the Delaware Bay region," by Peter Kinner and Don Maurer 209

Polydactylus sexfilis—see Threadfin

Population sizes
model for estimating historical
bias 773
bias estimation 772
variance 776
variance estimation 773

Porcupinefishes
egg and larval development, comments on 535
systematics and zoogeography 535

"Portable tripod drop net for estuarine fish studies," by R. Grant Gilmore, John K. Holt, Robert S. Jones, George R. Kulczycki, Louis G. MacDowell III, and Wayne C. Magley 285

Prawn, Malaysian
roles, prior residence and relative size 905

Prawn, spot
growth, in laboratory and net pens
using different diets 886

"Predicting abundance of striped bass, *Morone saxatilis*, in New York waters from modal lengths," by Herbert M. Austin and Clarence R. Hickey, Jr. 467

PRENTICE, EARL F.—see RENSEL and PRENTICE

"Principal spawning areas and times of marine fishes, Cape Sable to Cape Hatteras," by John B. Colton, Jr., Wallace G. Smith, Arthur W. Kendall, Jr., Peter L. Berrien, and Michael P. Fahay 911

Prionotus scitulus—see Searobin, leopard

"Probable case of streambed overseeding—1967 pink salmon, *Oncorhynchus gorbuscha*, spawners and survival of their progeny in Sashin Creek, southeastern Alaska," by William R. Heard 569

Prochristianella hispida
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 24

Protozoa
parasitic on penaeid shrimp
Cephalolobus penaeus ... 12
Ephelota sp. ... 21
Lagenophrys lunatus ... 17
Leptomonas sp. ... 21
Nematopsis brasiliensis ... 12
Nematopsis duorari ... 12
Nematopsis penaeus ... 12
Nosema nelsoni ... 13
Parauronema sp. ... 21
Pleistophora (Plistophora) penaei ... 14
Thelohania duorara ... 13
Thelohania penaei ... 13
Zoothamnium sp. ... 17

QUINN, WILLIAM H., DAVID O. ZOPF, KENT S. SHORT, and RICHARD T. W. KUO YANG, "Historical trends and statistics of the Southern Oscillation, El Niño, and Indonesian droughts" ... 663

"Recent records of *Callinectes danae* and *Callinectes margainatus* (Decapoda: Portunidae) from North Carolina with environmental notes," by Peter W. Perschbacher and Frank J. Schwartz ... 879

"Recent sightings of the blue whale, *Balenoptera musculus*, in the northeastern tropical Pacific," by Lawrence S. Wade and Gary L. Friedrichsen ... 915

"Reciprocal hybridization between the California and Gulf of California grunions, *Leuresthes tenuis* and *Leuresthes sardina* (Atherinidae)," by Nancy M. Moffatt and Donald A. Thomson ... 476

"Records of piscivorus leeches (Hirudinea) from the central Columbia River, Washington State," by C. Dale Becker and Dennis D. Dauble ... 926

Red Sea
immigration of fishes into the Mediterranean ... 251

"Relative contribution of Hudson, Chesapeake, and Roanoke striped bass, *Morone saxatilis*, stocks to the Atlantic coast fishery," by Thomas Berggren and Joel T. Lieberman ... 335

Renibulbus penaeus
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic ... 26

RENSEL, JOHN E., and EARL F. PRENTICE, "Growth of juvenile spot prawn, *Pandalus platyceros*, in the laboratory and in net pens using different diets" ... 886

RICE, D. W., JR., and F. L. HARRISON, "Copper sensitivity of Pacific herring, *Clupea harengus pallasi*, during its early life history" ... 347

RIVARD, D., and L. J. BLEDSOE, "Parameter estimation for the Pella-Tomlinson stock production model under nonequilibrium conditions" ... 523

ROBERTS, JOHN L., and JEFFREY B. GRAHAM, "Effect of swimming speed on the excess temperatures and activities of heart and red and white muscles in the mackerel, *Scomber japonicus*" ... 861

Rockfish, blue
kelp forests off Santa Barbara, California
diet and habitat distribution ... 257

Rockfish, olive
kelp forests off Santa Barbara, California
diet and habitat distribution ... 257

RODGERS, CAROLYN A., DOUGLAS C. BIGGS, and RICHARD A. COOPER, "Aggregation of the siphonophore *Nanomia cara* in the Gulf of Maine: observations from a submersible" ... 281

"(The) roles of prior residence and relative size in competition for shelter by the Malaysian prawn, *Macrobrachium rosenbergii*," by John B. Peebles ... 905

ROSS, STEPHEN T., "Trophic ontogeny of the leopard searobin, *Prionotus scitulus* (Pisces: Triglidae)" ... 225

Rouleina attrita
taxomomy and distribution
description ... 83
distribution ... 85
ecology ... 84
key ... 81
nomenclature ... 81

Rouleina maderensis
taxonomy and distribution
description ... 84
distribution ... 85
ecology ... 84
key ... 81

RUSSO, JOSEPH L.—see COLLETTE et al.

Salmo trutta—see Trout, brown

Salmon, chinook
Columbia River hatchery
bioeconomic contribution to Pacific salmon fisheries 179
mortalities, natural and fishing
estimating, based on recoveries of marked fish ... 45

Salmon, coho
juvenile, in small coastal stream of New Brunswick 487

Salmon, Pacific
bioeconomic contribution of fall chinook salmon ... 179
juvenile, in small coastal stream of New Brunswick 487

Salmon, pink
Sashin Creek, southeastern Alaska
streambed overseeding, probable case of ... 569

Salmon, sockeye
identifying stocks of Bristol Bay by evaluating scale patterns with polynomial discriminant method

discriminant function analyses or pattern recognition ... 415
high sea stocks ... 419
inshore stocks ... 420

Sampling, systematic
in a planktonic ecosystem ... 617

Sanddab, Pacific
feeding habits off Oregon
differences among stations ... 643
variations with season or size of fish ... 645
Heceta Bank, Oregon
distribution and abundance ... 629

Sanddab, speckled
thermal behavioral responses: laboratory and field investigations ... 867

Santa Barbara, California
kelp forests
food and habitat of three switch-feeding fishes ... 257

SANTERRE, MICHAEL T.—see MAY et al.

São Paulo, Brazil
Euterpina acutifrons
environmental variables on the metabolism, synergistic effects of ... 449

Sargasso Sea
zooplankton biomass distribution variability
Gulf Stream cold core rings contribution ... 323

Sarpa salpa
trophic relationships in South African marine littoral
dentition and gut morphology ... 398
dietary composition ... 397
recruitment and growth ... 393

Sashin Creek, southeastern Alaska
salmon, pink
streambed overseeding, probable case of ... 569

Scallop, rock
trace metal contamination
near a large southern California municipal outfall 936

Scarus croicensis—see Parrotfish, striped

SCHAAF, WILLIAM E.—see NICHOLSON and SCHAAF

SCHEKTER, RICHARD C.—see HOUDE and SCHEKTER

SCHOLZ, ALLAN T., JON C. COOPER, ROSS M. HORRALL, and ARTHUR D. HASLER, "Homing of morpholine-imprinted brown trout, *Salmo trutta*" ... 293

"School structure of the squid *Loligo opalescens*," by Ann C. Hurley ... 433

SCHWARTZ, FRANK J.—see PERSCHBACHER and SCHWARTZ

Scomber japonicus—see Mackerel, chub

Scomber scombrus—see Mackerel, Atlantic

Scomberomorus brasiliensis
new species, western Atlantic ... 273

"*Scomberomorus brasiliensis*, a new species of Spanish mackerel from the western Atlantic," by Bruce B. Collette, Joseph L. Russo, and Luis Alberto Zavala-Camin 273

Searobin, leopard
trophic ontogeny ... 225

Seatrout, spotted
eggs and larvae, description
embryonic development ... 66
growth ... 70
larval development ... 67

Sebastes mystinus—see Rockfish, blue

Sebastes serranoides—see Rockfish, olive

Selenium
Hawaiian Islands
marlin, blue, found in ... 872

"Sex composition, length-weight relationship, and reproduction of the white marlin, *Tetrapturus albidus*, in the western north Atlantic Ocean," by Raymond E. Baglin, Jr. ... 919

Shellfish
pollution-associated diseases and abnormalities
experimentally induced lesions ... 736
genetic abnormalities ... 734
neoplasms ... 728
pollutant-parasite interactions ... 740
shell disease ... 724

SHORT, KENT S.—see QUINN et al.

Shrimp
intersex anomalies of the genus *Penaeopsis* ... 687

Shrimp, brown
aspects of growth in Gulf of Mexico
length ... 829
weight ... 831
small preserved
number and length frequency, subsampler for estimating ... 490

Shrimp, hippolytid
Lebbeus groenlandicus
larvae, description of ... 457

Shrimp, humpy
Kachemak Bay, Alaska
larvae, description of ... 235

Shrimp, penaeid
diseases, parasites, and toxic responses in Gulf of Mexico and South Atlantic coasts of North America

bacteria 6
broken-back syndrome 40
cadmium 32
chemotherapeutic chemicals 35
DDT 28
dieldrin 28
fungi 10
gas bubble disease 39
mercury 33
mirex 29
muscle necrosis, spontaneous 37
nematodes 26
organochlorines 28
organophosphates and carbamates 30
PCB's 29
petroleum 32
platyhelminthes 23
protozoa 10
"shell disease" and black gills 39
tumors 37
viruses 2

Shrimp, pink
physical and chemical changes due to holding
carbon dioxide modified refrigerated seawater compared with ice 73

SHULTZ, CYNTHIA D., and BERNARD M. ITO, "Mercury and selenium in blue marlin, *Makaira nigricans*, from the Hawaiian Islands" 872

SIBUNKA, J. D.—see SMITH et al.

Silverside, tidewater
small preserved
number and length frequency, subsampler for estimating 490

"Simulated food patches and survival of larval bay anchovy, *Anchoa mitchilli*, and sea bream, *Archosargus rhomboidalis*," by Edward D. Houde and Richard C. Schekter 483

SINDERMANN, CARL J., "Pollution-associated diseases and abnormalities of fish and shellfish: a review" 717

Siphonophore
Nanomia cara
aggregation 281

"Skipjack tuna, *Katsuwonus pelamis*, habitat based on temperature and oxygen requirements," by Richard A. Barkley, William H. Neill, and Reginald M. Gooding . 653

SMIGIELSKI, ALPHONSE S., "Induced spawning and larval rearing of the yellowtail flounder, *Limanda ferruginea*" 931

SMITH, T. D., and T. POLACHECK, "Analysis of a simple model for estimating historical population sizes" .. 771

SMITH, W. G., J. D. SIBUNKA, and A. WELLS, "Diel movements of larval yellowtail flounder, *Limanda ferruginea*, determined from discrete depth sampling" ... 167

SMITH, WALLACE G.—see COLTON et al.

Sole, Dover
feeding habits off Oregon
differences among stations 643
variations with season or size of fish 645
Heceta Bank, Oregon
distribution and abundance 629

Sole, rex
feeding habits off Oregon
differences among stations 643
variations with season or size of fish 645
Heceta Bank, Oregon
distribution and abundance 629

Sole, slender
feeding habits off Oregon
differences among stations 643
variations with season or size of fish 645
Heceta Bank, Oregon
distribution and abundance 629

Spawning
flounder, yellowtail
induced 931
marine fishes
principal areas and times of 911

"Spawning cycle, fecundity, and recruitment in a population of soft-shell clams, *Mya arenaria*, from Cape Ann, Massachusetts," by Diane J. Brousseau 155

Spawning, lunar
threadfin, in Hawaii 900

Squid
Loligo opalescens
school structure 433

SQUIRE, JAMES L. JR., "Northern anchovy school shapes as related to problems in school size estimation" 443

STEPHENS, JOHN S.—see EHRLICH et al.

Stock-production models
time-dependent solutions and efficient parameters
Graham system analysis 378
Pella-Tomlinson system analysis 382

STOUT, VIRGINIA F., and F. LEE BEEZHOLD, "Analysis of chlorinated hydrocarbon pollutants: a simplified extraction and cleanup procedure for fishery products" 880

"Subsampler for estimating the number and length frequency of small preserved nektonic organisms," by William H. Herke 490

Suez Canal
immigration of fishes 249

Sullivan Harbor, Maine
bloodworm, tychoplanktonic 480

"Summer food of the Pacific Cod, *Gadus macrocephalus*, near Kodiak Island, Alaska," by Stephen C. Jewett .. 700

"Surface feeding by a juvenile gray whale, *Eschrichtius robustus*," by G. M. Wellington and Shane Anderson . 290

Swimming speeds
mackerel, chub
effect on excess temperatures and activities of heart and red and white muscles 861
role of different fibre types in fish myotomes
carp 693
herring, Pacific 692
trout, rainbow 694

SYMONS, PHILIP E. K., and JAMES D. MARTIN, "Discovery of juvenile Pacific salmon (coho) in a small coastal stream of New Brunswick" 487

"Synergistic effects of environmental variables on the metabolism of the copepod *Euterpina acutifrons* from two different areas off the coast of the State of São Paulo, Brazil," by G. Soares Moreira and W. B. Vernberg ... 449

"Systematic sampling in a planktonic ecosystem," by E. L. Venrick 617

"Systematics and zoogeography of the porcupinefishes, (*Diodon*, Diodontidae, Tetraodontiformes), with comments on egg and larval development," by Jeffrey M. Leis 535

Tampa Bay, Florida
searobin, leopard
trophic ontogeny 225

"Taxonomy and distribution of *Rouleina attrita* and *Rouleina maderensis* (Pisces: Alepocephalidae)," by Douglas F. Markle 79

Temperature
Euphausia pacifica
thermal increases of short duration, effect on survival 895

TESTEVERDE, SALVATORE A.—see KATONA et al.

Tetrapturus albidus—see Marlin, white

THEILACKER, GAIL H., "Effect of starvation on the histological and morphological characteristics of jack mackerel, *Trachurus symmetricus*, larvae" 403

Thelohania duorara
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 13

Thelohania penaei
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 13

"(A) theoretical examination of some aspects of the interaction between longline and surface fisheries for yellowfin tuna, *Thunnus albacares*," by William H. Lenarz and James R. Zweifel 807

"Thermal behavioral responses of selected California littoral fishes," by Karl F. Ehrlich, J. Myron Hood, Gerald Muszynski, and Gerald E. McGowen 837

"Thermal behavioral responses of the speckled sanddab, *Citharichthys stigmaeus*: laboratory and field investigations," by Karl F. Ehrlich, John S. Stephens, Gerald Muszynski, and J. Myron Hood 867

THOMSON, DONALD A.—see MOFFATT and THOMSON

Threadfin
Hawaii
lunar spawning 900

Thunnus albacares—see Tuna, yellowfin

Thynnascaris sp.
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 26

"Time-dependent solutions and efficient parameters for stock-production models," by R. Ian Fletcher 377

Tomcod, Atlantic
food and feeding habits of juveniles in Haverstraw Bay, Hudson River, New York 89

"Trace metal contamination of the rock scallop, *Hinnites giganteus*, near a large southern California municipal outfall," by David R. Young and Tsu-Kai Jan 936

Trachurus symmetricus—see Mackerel, jack

Tripod drop net—see Drop net, portable tripod

"Trophic ontogeny of the leopard searobin, *Prionotus scitulus* (Pisces: Triglidae)," by Stephen T. Ross 225

"Trophic relationships among fishes and plankton in the lagoon at Enewetak Atoll, Marshall Islands," by Edmund S. Hobson and James R. Chess 133

"Trophic relationships in juveniles of three species of sparid fishes in the South African marine littoral," by M. S. Christensen 389

Trout, brown
homing, morpholine-imprinted 293

Tuna, skipjack
temperature and oxygen requirements 653

Tuna, yellowfin
Pacific, eastern
catch-effort data, analysis of 523
theoretical examination of interaction between longline and surface fisheries
availability of stock to gear 809
effects of age-specific sex ratios on yield per recruit to gear and stock fecundity 813

simulation model of dispersal and recruitment patterns 816

Tychoplankton
Sullivan Harbor, Maine
bloodworm, tychoplanktonic 480

"Tychoplanktonic bloodworm, *Glycera dibranchiata*, in Sullivan Harbor, Maine" by Joseph J. Graham and Edwin P. Creaser, Jr. 480

United States, northeastern coast
fisheries, mixed species
linear programming simulations of effects of bycatch on management 851

"Variability in zooplankton biomass distribution in the northern Sargasso Sea: the contribution of Gulf Stream cold core rings," by Peter B. Ortner, Peter H. Wiebe, Loren Haury, and Steven Boyd 323

VENRICK, E. L.. "Systematic sampling in a planktonic ecosystem" 617

VERNBERG, W. B.—see MOREIRA and VERNBERG

"Vertical distribution, diel vertical migration, and abundance of some mesopelagic fishes in the eastern subarctic Pacific Ocean in summer," by Bruce W. Frost and Lawrence E. McCrone 751

"Vertical distribution and photosensitive vesicles of pelagic cephalopods from Hawaiian waters," by Richard Edward Young 583

VREELAND, ROY J.—see WAHLE and VREELAND

WADE, LAWRENCE S., and GARY L. FRIEDRICHSEN, "Recent sightings of the blue whale, *Balenoptera musculus*, in the northeastern tropical Pacific" 915

WAHLE, ROY J., and ROBERT R. VREELAND, "Bioeconomic contribution of Columbia River hatchery fall chinook salmon, 1961 through 1964 broods, to the Pacific salmon fisheries" 179

Washington State
leeches, piscivorus
records of, Columbia River 926

WELLINGTON, G. M., and SHANE ANDERSON, "Surface feeding by a juvenile gray whale, *Eschrichtius robustus*" 290

WELLS, A.—see SMITH et al.

Whale, blue
Pacific, northeastern tropical
recent sightings 915

Whale, grey
juvenile, surface feeding 290

WEIBE, PETER H.—see ORTNER et al.

WILLIAMS, THEODORE D.—see FABLE et al.

YANG, RICHARD T. W. KUO—see QUINN et al.

YOUNG, DAVID R., and TSU-KAI JAN, "Trace metal contamination of the rock scallop, *Hinnites giganteus*, near a large southern California municipal outfall" .. 936

YOUNG, RICHARD EDWARD, "Vertical distribution and photosensitive vesicles of cephalopods from Hawaiian waters" 583

ZAVALA-CAMIN, LUIS ALBERTO—see COLLETTE et al.

Zooplankton
biomass distribution variability in Sargasso Sea
biomass, regional 325
biomass structure, ring 331
biomass structure, shallow 329
diel migration 328
organic flux to deep sea 332
regional contribution of Gulf Stream cold core rings 329
vertical structure 328, 330
production, and ammonia excretion in Kuroshio and adjacent seas
biomass, habitat temperature, and size distribution 357
feeding and production estimates 361
mortality loss during production 362
ratio of herbivores to carnivores 363
respiration and ammonia excretion 360

Zoothamnium sp.
parasitic on penaeid shrimp in Gulf of Mexico and South Atlantic 17

ZOPF, DAVID O.—see QUINN et al.

ZWEIFEL, JAMES R.—see LENARZ and ZWEIFEL